ENVIRONMENTAL AND EXPERIMENTAL BOTANY

An International Journal

Editor-in-Chief: Morton W. MILLER, Rochester

VOLUME CONTENTS, AUTHOR AND SUBJECT INDEX

VOLUME 28, 1988

PERGAMON PRESS Oxford · New York
Beijing · Frankfurt · São Paulo · Sydney · Tokyo · Toronto

ENVIRONMENTAL AND EXPERIMENTAL BOTANY

Editor-in-Chief

MORTON W. MILLER, Department of Biophysics, The University of Rochester, School of Medicine and Dentistry, Rochester, NY 14642, U.S.A. (Tel. (716)275-3634)

Editorial Board

S. I. AUERBACH, Oak Ridge National Laboratory, Oak Ridge, TN, U.S.A.
P. BARLOW, University of Bristol Research Station, U.K.
P. F. BOURDEAU, Comm. of the European Commun., Brussels, Belgium
R. D. BROCK, CSIRO, Canberra, Australia
J. BRYAN, Syracuse University, Syracuse, NY, U.S.A.
J. CAIN, Illinois State University, Normal, IL, U.S.A.
A. D. CONGER, Temple University School of Medicine, Philadelphia, PA, U.S.A.
B. V. CONGER, University of Tennessee, Knoxville, TN, U.S.A.
M. J. CONSTANTIN, Phyton Technologies Inc., 7327 Oak Ridge Highway, Knoxville, TN, U.S.A.
F. D'AMATO, Ist. Di Genetica Della Univ., Pisa, Italy
D. DAVIDSON, McMaster University, Hamilton, Ont., Canada
D. R. DAVIES, John Innes Institute, Norwich, U.K.
L. S. EVANS, Manhattan College, Bronx, NY, U.S.A.
J. S. JACOBSON, Boyce Thompson Institute, Ithaca, NY, U.S.A.
P. C. KESAVAN, Jawaharlal Nehru University, New Delhi, India
B. A. KIHLMAN, Royal Agr. College of Sweden, Uppsala, Sweden
R. M. KLEIN, University of Vermont, Burlington, VT, U.S.A.
W. H. KLEIN, 7901 Kentbury Dr., Bethesda, MD 20814, U.S.A.
C. KONZAK, Washington State University, Pullman, WA, U.S.A.
C. C. KUEHNERT, Syracuse University, Syracuse, NY, U.S.A.
C. LÜTZ, GSF München, Institut für Biochemische Pflanzenpathologie, Ingolstädter Landstrasse 1, D-8042 Neuherberg, F.R.G.
S. MCNAUGHTON, Syracuse University, Syracuse, NY, U.S.A.
J. MOUTSCHEN, University of Liège, Liège, Belgium
P. E. PILET, Inst. Biologie/Physiologie Veg., Université de Lausanne, 1015 Lausanne, Switzerland
D. J. RAYNAL, SUNY—Coll. Environ. Sci. and Forestry, Syracuse, NY, U.S.A.
R. J. ROMANI, University of California, Davis, CA, U.S.A.
J. R. K. SAVAGE, MRC Radiobiology Research Unit, Berkshire, U.K.
M. S. SWAMINATHAN, International Rice Institute, Manila, Philippines
J. C. V. VU, USDA-ARS Hort. Res. Lab., Orlando, FL, U.S.A.
P. L. WALNE, University of Tennessee, Knoxville, TN, U.S.A.
P. WEBSTER, University of Massachusetts, Amherst, MA, U.S.A.
H. YAMAGATA, Kyoto University, Kyoto, Japan
H. YAMAGUCHI, University of Tokyo, Tokyo, Japan

Editorial Assistant: MARYLYNN M. MILLER

Publishing, Subscription and Advertising Offices
Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, U.K.
Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.

Annual Institutional Subscription rate (1989): U.S. $235.00.

Two-year Institutional rate (1989/90): U.S. $446.50.
Personal subscription rate for those whose library subscribes at the regular rate (1989): U.S. $65.00.

Prices are subject to change without notice.

Microform Subscriptions and Back Issues
Subscription enquiries from customers in North America should be sent to: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, U.K. Back issues of all previously published volumes are available direct from Pergamon Press. Back issues of Pergamon journals in microform can be obtained from: UMI, 300 North Zeeb Road, Ann Arbor, MI 48106, U.S.A.

Published Quarterly Copyright © 1989 Pergamon Press plc

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A. The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-Fee Code for this publication is: 0098−8472/88 $3.00 + 0.00

CONTENTS VOLUME 28

NUMBER 1

D. O. Giménez and C. P. Rumi	1	Interaction of night temperature and photoperiod on *Bromus unioloides* H.B.K. aerial biomass components
I. Pepper, N. Galanti, J. Sans and J. F. Lopez Saez	9	Reversible inhibition of root growth and cell proliferation by pentavalent arsenic in *Allium cepa* L.
A. F. Vogelmann and B. N. Rock	19	Anatomy of red spruce needles from forest decline sites in Vermont
R. C. Musselman	27	Acid neutralizing capacity of leaves exposed to acidic fog
R. Kappler and U. Kristen	33	Photometric quantification of water-insoluble polysaccharides produced by *in vitro* grown pollen tubes
E. C. Tseng, J. R. Seiler and B. I. Chevone	37	Effects of ozone and water stress on greenhouse-grown Fraser fir seedling growth and physiology
W. L. Banwart, P. M. Porter, E. L. Ziegler and J. J. Hassett	43	Growth parameter and yield component response of field corn to simulated acid rain
A. H. Chappelka, M. E. Kraemer, T. Mebrahtu, M. Rangappa and P. S. Benepal	53	Effects of ozone on soybean resistance to the Mexican bean beetle (*Epilachna varivestis* Mulsant)
A. M. Castro, C. P. Rumi and H. O. Arriaga	61	Influence of greenbug on root growth of resistant and susceptible barley genotypes
C. A. Zammit and P. H. Zedler	73	Germination response to extreme acidity: impact of simulated acid deposition from a single shuttle launch
Software Survey Section	I	

NUMBER 2

M. W. Miller	83	Editorial
L. Guidi, G. Lorenzini and G. F. Soldatini	85	Phytotoxicity of sea-water aerosols on forest plants with special reference to the role of surfactants
F. Kőrösi, L. András and I. Krakkai	95	Dose distribution anomalies due to unevenly distributed boron in neutron irradiated plant materials
V. N. Bhivare, J. D. Nimbalkar and P. D. Chavan	117	Photosynthetic carbon metabolism in French bean leaves under saline conditions
W. E. Williams, K. Garbutt and F. A. Bazzaz	123	The response of plants to elevated CO_2—V. Performance of an assemblage of serpentine grassland herbs
A. Hidalgo, P. Navas and G. Garcia-Herdugo	131	Growth inhibition induced by vanadate in onion roots
R. Hewamanna, C. M. Samarakoon and P. A. V. N. Karunaratne	137	Concentration and chemical distribution of radium in plants from monazite-bearing soils
L. Silberstein and M. Galun	145	Spectrophotometric estimation of chlorophyll in lichens containing anthraquinones in relation to air pollution assessments

L. L. SIGAL, S. EVERSMAN and D. L. BERGLUND — 151 — Isolation of protoplasts from loblolly pine needles and their flow-cytometric analysis for air pollution effects

Announcement — 163

Software Survey Section — I

NUMBER 3

R. MORPURGO and R. ORTIZ — 165 — Morphological variation of the potato (*Solanum* spp.) under contrasting environments

A. CHROMINSKI, R. B. BHAT, D. J. WEBER and B. N. SMITH — 171 — Osmotic stress-dependent conversion of 1-aminocyclopropane-1-carboxylic acid (ACC) to ethylene in the halophyte, *Allenrolfea occidentalis*

D. A. SCHAEFER, W. A. REINERS and R. K. OLSON — 175 — Factors controlling the chemical alteration of throughfall in a subalpine balsam fir canopy

I. A. TRAUTMANN and J. H. VISSER — 191 — The assimilation of aspartic and glutamic acids by the root parasites *Alectra orobanchoides* Benth. and *Alectra vogelii* Benth. (Scrophulariaceae)

W. NAGL — 197 — Genome changes induced by auxin-herbicides in seedlings and calli of *Zea mays* L.

C. D. DUSTIN and D. J. RAYNAL — 207 — Effects of simulated acid rain on sugar maple seedling root growth

L. P. NYMAN and J. A. ARDITTI — 215 — Effects of artificial seawater on morphology and anatomy of taro (*Colocasia esculenta* var *antiquorum*, Araceae) tissues *in vitro*

J. T. HARRINGTON and J. R. SEILER — 225 — Acetylene reduction in black alder seedlings as affected by direct and indirect moisture deficits using a split-pot growing system

F. J. CASTILLO and H. GREPPIN — 231 — Extracellular ascorbic acid and enzyme activities related to ascorbic acid metabolism in *Sedum album* L. leaves after ozone exposure

T. YOUNGLOVE, P. M. MCCOOL, R. C. MUSSELMAN and E. D. SMITH — 239 — The use of transfer function models to describe the relationship between pollutant exposure and leaf stomatal opening

L.-C. HUANG and D.-L. CHI — 249 — Pivotal roles of picloram and gelrite in banana callus culture

K. U. PAI and B. K. GAUR — 259 — Enzymatic lipid peroxidation and its prevention by succinate in mitochondria isolated from gamma-irradiated bean hypocotyls

R. J. LEBOWITZ — 267 — Digital image analysis measurement of root length and diameter

Software Survey Section — I

NUMBER 4

R. E. SOJKA — 275 — A review: Measurement of root porosity (volume of root air space)

X. Y. CHENG and M. W. GAO — 281 — Biological and genetic effects of combined treatments of sodium azide, gamma rays and EMS in barley

J. R. SHANN and D. C. ADRIANO — 289 — The chronic exposure of selected crop species to boron aerosols

D. L. TAO, Y. H. JIN and Y. J. DU — 301 — Novel photosynthesis–light curves of solar-exposed versus shaded Korean pine seedlings

P. M. McCool, R. C. Musselman, T. Younglove and R. R. Teso	307	Response of kidney bean to sequential ozone exposures
M. Torres, S. Perez-Boada and J. M. Duran	315	Growth analysis by different mathematical models of barley plants after u.v.-A irradiation
P. J. Temple	323	Injury and growth of Jeffrey pine and giant sequoia in response to ozone and acidic mist
Z. Tomaszewski, Jr., B. V. Conger, H. Brunner and F. J. Novak	335	Effects of gamma radiation on the *in vitro* response of *Dactylis glomerata* leaf segments
F. Murray and S. Wilson	343	Joint action of sulfur dioxide and hydrogen fluoride on growth of *Eucalyptus tereticornis*
J. R. Mahan and D. R. Upchurch	351	Maintenance of constant leaf temperature by plants—I. Hypothesis—limited homeothermy
D. R. Upchurch and J. R. Mahan	359	Maintenance of constant leaf temperature by plants—II. Experimental observations in cotton
C. Rinallo, A. Bennici and E. Cenni	367	Effects of two surfactants on *Triticum durum* Desf. plantlets
M. J. Olszewska, H. Kuran and K. Marciniak	375	Relationship between resumption of rRNA transport into cytoplasm after cold treatment and progression through the cell cycle in root meristem cells
H. F. Crowell and R. E. J. Boerner	381	Influences of mycorrhizae and phosphorus on belowground competition between two old-field annuals
Software Survey Section	I	